APPENDIX E
SAMPLE BOTTLE AND EQUIPMENT CLEANING PROCEDURES

Cleaning procedures should be established for all sample containers and equipment used for sample collection in the field and/or sample storage in the laboratory, and should be completed prior to sample collection. Teflon tubing, lids, and strainers, may all contact the sample during collection, therefore they must also be cleaned with the appropriate procedures. In addition, while performing these procedures personnel must use the correct equipment and safety gear.

The following examples outline cleaning procedures that may be used for composite bottles (carboys), metals analysis storage bottles, and teflon tubing, lids, and strainers. Appropriate cleaning solutions, safety precautions, and quality control are also discussed.

➤ EXAMPLE CLEANING PROCEDURES

Composite Bottles (carboys)

1. Rinse bottle with warm tap water three times as soon as possible after emptying sample.

2. Soak in a 2% detergent (e.g., Contrad®) solution for 48 hours; scrub with clean plastic brush.

3. Rinse three times with tap water.

4. Rinse five times with Milli-Q® or equivalent water (passed through two filters after deionized system), rotating the bottle to ensure contact with the entire inside surface.

5. Rinse three times with hexane, rotating the bottle to ensure contact with the entire inside surface (use 30 ml per rinse).

6. Rinse six times with Milli-Q water.

7. Rinse three times with 2N nitric acid (1 liter per bottle, per rinse) rotating the bottle to ensure contact with the entire inside surface.

8. Rinse six times with Milli-Q water.

9. Cap bottle with Teflon lined lid cleaned as specified below.

Metals Analysis Storage Bottles

1. Use only new, plastic 0.5 liter bottles.

2. Rinse five times with Milli-Q water, rotating the bottle to ensure contact with the entire inside surface.

3. Rinse three times with 2N nitric acid (20ml per bottle per rinse), rotating the bottle to ensure contact with the entire inside surface.

4. Rinse with Milli-Q water six times.

5. Store bottles filled with 1% metal-free nitric acid solution until ready to use.

6. Empty acid solution and rinse three times with Milli-Q water.

Teflon Tubing, Lids, and Strainers

1. Make up a 2% solution of disinfectant soap (e.g. Micro®) in warm tap water.

2. Rinse tubing three times with the 2% Micro Solution, wash lids and strainers with micro solution and plastic brush.

3. Rinse three times with tap water.

4. Rinse three times with Milli-Q water.

5. Rinse three times with a 2N nitric acid solution.

6. Soak 24 hours in a 2N nitric acid solution.

7. Rinse three times with Milli-Q water.

8. Seal the tubing on both ends with clean latex material

9. Individually double-bag tubing in new polyethylene bags properly labeled. Double-bag lids and strainers individually in zip-lock bags.

➤ CLEANING SOLUTIONS

2% Contrad = 200 ml concentrated Contrad (detergent) per full 10L bottle
2% HNO_3 Acid = 80 ml concentrated HNO_3 acid (16N) per gallon of Milli-Q water
2% Micro = 80 ml concentrated Micro (disinfectant) per gallon of Milli-Q water

➤ SAFETY PRECAUTIONS

All of the appropriate safety equipment must be worn by personnel involved in the cleaning of the bottles due to the corrosive nature of the chemicals being used to clean the bottles and tubing. This safety equipment must include protective gloves, lab coats, chemically resistant aprons, goggles with side shields and respirators. All material safety data sheets (MSDSs) must be read and signed-off by personnel.

➤ QUALITY CONTROL

Powder-free nitrile gloves must be worn while cleaning and handling bottles and equipment. Care must be taken at all times to avoid introduction of contamination from any source.

To account for any contamination introduced by sampling containers, blanks must be collected for composite bottles and laboratory bottles used for sample storage for metals analysis. A sampling container blank is prepared by filling a clean container with blank water and measuring the concentrations of selected constituents (typically metals and trace organics for composite bottles; metals analysis only for metals storage bottles). These blanks may be submitted "blind" to the laboratory by field personnel or prepared internally by the laboratory. Collection of sample container blanks is not required if certified pre-cleaned bottles are used. The manufacturer can provide certification forms that document the concentration to which the bottles are "contaminant-free"; these concentrations should be equivalent to or less than the program reporting limits. If the certification level is above the program reporting limits, 2% of the bottles in a "lot" or "batch" should be blanked at the program detection limits with a minimum frequency of one bottle per batch. A batch is a group of samples that are cleaned at the same time and in the same manner; or, if decontaminated bottles are sent directly from the manufacturer, the batch would be the lot designated by the manufacturer in their testing of the bottles.